

DEC 13 2005

PTO/SB/21 (09-04)

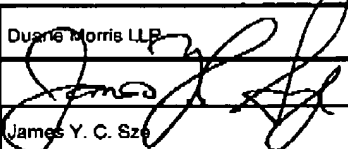
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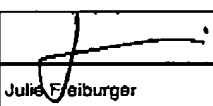
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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TRANSMITTAL FORM (to be used for all correspondence after initial filing)	Application Number	10/775,731	
	Filing Date	February 9, 2004	
	First Named Inventor	Tung-Shuan Cheng	
	Art Unit	2816	
	Examiner Name	ZWEIG, JEFFERY SHAWN	
Total Number of Pages in This Submission	22	Attorney Docket Number	TSMC2003-1129(N1280-00350)

ENCLOSURES (Check all that apply)		
<input checked="" type="checkbox"/> Fee Transmittal Form <input type="checkbox"/> Fee Attached <input type="checkbox"/> Amendment/Reply <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s) <input type="checkbox"/> Extension of Time Request <input type="checkbox"/> Express Abandonment Request <input type="checkbox"/> Information Disclosure Statement <input type="checkbox"/> Certified Copy of Priority Document(s) <input type="checkbox"/> Reply to Missing Parts/Incomplete Application <input type="checkbox"/> Reply to Missing Parts under 37 CFR 1.52 or 1.53	<input type="checkbox"/> Drawing(s) <input type="checkbox"/> Licensing-related Papers <input type="checkbox"/> Petition <input type="checkbox"/> Petition to Convert to a Provisional Application <input type="checkbox"/> Power of Attorney, Revocation <input type="checkbox"/> Change of Correspondence Address <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Request for Refund <input type="checkbox"/> CD, Number of CD(s) _____ <input type="checkbox"/> Landscape Table on CD	<input type="checkbox"/> After Allowance Communication to TC <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input checked="" type="checkbox"/> Appeal Communication to TC (Appeal Notice, Brief, Reply Brief) <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input type="checkbox"/> Other Enclosure(s) (please identify below):
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SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT			
Firm Name	Duane Morris LLP		
Signature			
Printed name	James Y. C. Sze		
Date	December 12, 2005	Reg. No.	43,943

CERTIFICATE OF TRANSMISSION/MAILING			
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Signature			
Typed or printed name	Julie Feiburger	Date	December 13, 2005

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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SD/80714

DEC 13 2005

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Effective on 12/08/2004.
Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).**FEE TRANSMITTAL
For FY 2005**☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$) 500.00

Complete if Known

Application Number	10/775,731
Filing Date	February 9, 2004
First Named Inventor	Tung-Shuan Cheng
Examiner Name	ZWEIZIG, JEFFERY SHAWN
Art Unit	2816
Attorney Docket No.	TSMC2003-1129(N1280-00350)

METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____

☒ Deposit Account Deposit Account Number: 04-1679 Deposit Account Name: Duane Morris LLP

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☒ Charge fee(s) indicated below ☒ Charge fee(s) indicated below, except for the filing fee

☒ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17 ☒ Credit any overpayments

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FEE CALCULATION**1. BASIC FILING, SEARCH, AND EXAMINATION FEES**

Application Type	FILING FEES		SEARCH FEES		EXAMINATION FEES		Fees Paid (\$)
	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	
Utility	300	150	500	250	200	100	
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	Fee (\$)	Small Entity Fee (\$)
Each claim over 20 (including Reissues)	50	25
Each independent claim over 3 (including Reissues)	200	100
Multiple dependent claims	360	180
Total Claims	Extra Claims	Fee (\$)
- 20 or HP = _____ x _____ = _____		
HP = Highest number of total claims paid for, if greater than 20.		
Indep. Claims	Extra Claims	Fee (\$)
- 3 or HP = _____ x _____ = _____		
HP = highest number of independent claims paid for, if greater than 3.		

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee (\$)	Fee Paid (\$)
- 100 = _____ / 50 = _____ (round up to a whole number) x _____ = _____				

4. OTHER FEE(S)

Non-English Specification, \$130 fee (no small entity discount)

Other (e.g., late filing surcharge): APPEAL BRIEF

500.00

SUBMITTED BY

Signature	Registration No. 43,843	Telephone 619-744-2293
Name (Print/Type) James Y. C. Sz	(Attorney/Agent)	Date December 12, 2005

This collection of information is required by 37 CFR 1.136. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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SD/80717

DEC 13 2005

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of
CHENG et al.

Confirmation No. 1527
Atty. Ref.: TSMC2003-1129 (N1280-
00350)
T.C. / Art Unit: 2816
Examiner: Zweizig, J.S.

Appln. No. 10/775,731

Filed: February 9, 2004

FOR: A CONFIGURABLE VOLTAGE GENERATOR

* * *

BRIEF FOR EX PARTE APPEAL

Due: December 23, 2005

Mail Stop Appeal Brief – Patents
Hon. Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Appellants submit this Brief under 37 C.F.R. § 41.37 to appeal the Examiner's final rejections of claims 1-20, as set forth in his/her Office Action mailed June 23, 2005. The fee required under 37 C.F.R. § 41.20(b)(2) is attached.

The Notice of Appeal is filed herewith, along with attached petition and fee required under 37 C.F.R. § 1.136.

Reversal of the Examiner's claim rejections by the Board of Patent Appeals and Interferences (the "Board") is respectfully requested.

I. REAL PARTY IN INTEREST

The assignee, Taiwan Semiconductor Manufacturing Company holds all rights in the subject invention by the assignment recorded in the U.S. Patent and Trademark Office on March 01, 2004 starting at reel 015015 and frame 0872.

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II. RELATED APPEALS AND INTERFERENCES

Appellants, the assignee, and its legal representative do not know of any prior or pending appeal, interference, or judicial proceeding which is related to, directly affects or is directly affected by, or has a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

Claims 1-20 are pending. Claims 1-20 were examined in this application and are at issue in this appeal. The claims on appeal are set forth in the Claims Appendix.

IV. STATUS OF AMENDMENTS

An Amendment was submitted under 37 C.F.R. § 1.116 on September 22, 2005. The Examiner stated in his/her Advisory Action mailed October 7, 2005 that the amendment would not be entered.

No amendment was filed subsequent to final rejection.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Embodiments of the invention a configurable voltage generator configured to generate multiple levels of output. It includes an oscillator module to generate a pumping signal and a digital to analog (D/A) converter coupled to the oscillator for generating one or more analog signals of a predetermined voltage level based on the pumping signal as configured by a set of inputs thereof, and a charge pump coupled to the D/A converter to produce a direct current (DC) output based on the analog signals generated by the D/A converter.

The invention involved in this appeal is directed to a configurable voltage generator with an oscillator module, a digital to analog converter to generate one or more analog signals of a predetermined voltage level, a charge pump to produce direct current output based on the analog signals generated by the digital to analog converter, wherein one or more outputs are configurable by adjusting the inputs of the digital to analog converter (see pending claim 1). Original claim 1 and the specification (pages 5-8) support claim 1 as presented.

Dependent claims 2-11 are directed to particular embodiments of this invention which further specify the elements of claim 1.

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Claim 12 is directed to a configurable voltage generator with an oscillator module that generates a square signal, a digital to analog converter to generate one or more analog signals of a predetermined voltage level, and a negative charge pump to produce direct current output based on the analog signals generated by the digital to analog converter (see pending claim 12). Claim 17 specifies a method embodiment mirroring claim 12. Original claim 12 and 17 and the specification (pages 7-8) support claim 12 and 17 as presented.

Dependent claims 13-16, and 18-20 are directed to particular embodiments of this invention which further specify the elements of claims 12 and 17.

Therefore, the invention as presently claimed is clearly supported by the original disclosure filed by Appellants.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

- A. Under 35 U.S.C. 132(a), 1st paragraph, was it proper to cancelled amendments of the specification as allegedly "new matter"?
- B. Under 35 U.S.C. 112, 1st paragraph, was it proper to reject claims 1-20 as allegedly lacking written description in the specification?
- C. Under 35 U.S.C. 112, 1st paragraph, was it proper to reject claims 1-20 as allegedly not enabled by the specification?
- D. Under 35 U.S.C. 102(b), was it proper to reject claims 1, 4, 5, 10 and 11 as allegedly anticipated by Chow (U.S. Patent 6,002,599)?
- E. Under 35 U.S.C. 103(a), was it proper to reject claims 2, 3, 6, 12-14, 16-18, 20 as allegedly unpatentable over Chow (U.S. Patent 6,002,599) in view of Katsuhisa (U.S. Patent 6,762,640) or Komiya et al (U.S. Patent 6,714,065)?

VII. ARGUMENT

Claims 1, 4 6, 10 & 11 and 2, 3, 6, 12-14, 16-18, 20 do not stand or fall together because the rejections of claims 2, 3, 6, 12-14, 16-18, 20 depend on the citation of additional prior art references.

Specification objections Based on 35 U.S.C. 132

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Applicants amended the specification in an Amendment filed May 23, 2005. The Examiner objected to the amendments to the specification, under 35 U.S.C. § 132, alleging that the amendment introduces new matter into the disclosure and has further required the applicant to cancel the new matter. The Examiner further objected to the addition of an output capacitor in Fig. 4a, as adding new matter.

Attorneys for the Applicant canceled the subject matter in a telephone interview with the Examiner. Therefore, the subject matter to which the Examiner objected is canceled, and the objection under 35 U.S.C. § 132 should now be withdrawn.

35 U.S.C. 112 – Written Description

The specification must convey with reasonable clarity to persons skilled in the art that applicant was in possession of the claimed invention as of the filing date sought. See *Vas-Cath v. Mahurkar*, 19 USPQ2d 1111, 1117 (Fed. Cir. 1991). The description includes "words, structures, figures, diagrams, formulas, etc., that fully set forth the claimed invention." *Lockwood v. American Airlines*, 41 USPQ2d 1961, 1966 (Fed. Cir. 1997). But the Patent Office has the initial burden of presenting evidence or a reason why persons of ordinary skill in the art would not have recognized such a description of the claimed invention in the original disclosure. See *In re Gosteli*, 10 USPQ2d 1614, 1618 (Fed. Cir. 1989).

A device disclosed in the specification that inherently performs a function or has a property, operates according to a theory, or has an advantage necessarily discloses that function, theory, or advantage even though the specification says nothing explicit about the characteristic. See *In re Smythe*, 178 USPQ 279, 285 (C.C.P.A. 1973). An amendment introducing an inherent characteristic of such a device into the claims is not prohibited by the written description requirement. See *id.*

Claims 1-20 were rejected under Section 112, first paragraph, because the Examiner apparently did not understand the relationship between the claims oscillator, DAC and charge pump and felt that the relationship was made clear in the specification as originally filed, and that the alleged new matter was being used to enable the claims. A review of the amendments that were made to the claims shows that *no new matter was introduced into the claims by amendment*. The alleged new matter was added to the specification, and has been canceled.

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Thus, the written description rejection essentially boils down to a question of whether the claims were enabled by the specification as filed. Appellants traverse because the challenged limitations would be recognized as implicitly described in the original disclosure by persons of ordinary skill in the art. The amendments do not go beyond the description of the invention as originally filed. Instead, they merely clarify the original intent of Appellants in claiming their invention.

Support for the claims is found on page 7 of the specification. As originally filed, the specification states that “FIG. 4A illustrates a typical n-bit D/A converter, which transforms binary inputs into an analog equivalent. . . .” [0028]. Fig. 4A as originally submitted depicts a prior art D/A converter of the charge redistribution type. This figure is identical to the configuration of Fig. 4-23 of Razavi p. 75, excerpts of which were attached to the applicant’s May 23 amendment and response. Razavi refers to Fig. 4-23 as “a typical capacitor DAC.” Hence that DAC circuit and its operation of converting digital to analog signal levels were well known in the art. Moreover, the output capacitor that applicants had added to Fig. 4a to clarify the DAC’s operation is not necessary for that purpose, and was not required to enable one of ordinary skill in the art to practice the claimed invention. Razavi, Fig. 4-23 does not show such a capacitor, and the DAC 306 sees the capacitance of output capacitor 312 for the full circuit (Fig. 3A). Thus the DAC’s operation is enabled without the addition of a capacitor between elements 306 and 310.

A specification need not teach, and preferably omits, what is well known in the art. See *Hybritech v. Monoclonal Antibodies*, 231 USPQ 81, 94 (Fed. Cir. 1986).

Claims 1-20 were rejected under Section 112, first paragraph, because it was alleged that they contain “subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.” Appellants traverse because the specification teaches a representative number of species within the claimed genus. The guidance that the Examiner alleges would be required but is absent from this specification would have been known to a person skilled in the art at the time this application was filed.

Withdrawal of the written description rejection made under Section 112, first paragraph, is requested because the specification conveys to a person skilled in the art that Appellants were

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in possession of the claimed invention. Their disclosure would also teach a skilled person, who possesses general knowledge available in the art, how to make and use the claimed invention.

35 U.S.C. 112 – Enablement

The Patent Office has the initial burden to question the enablement provided for the claimed invention. M.P.E.P. § 2164.04, and the cases cited therein. It is incumbent upon the Patent Office, whenever a rejection on this basis is made, to explain why it doubts the truth or accuracy of any statement in a supporting disclosure and to back up assertions of its own with acceptable evidence or reasoning which is inconsistent with the contested statement. *In re Marzocchi*, 169 USPQ 367, 370 (C.C.P.A. 1971). Specific technical reasons are always required. See M.P.E.P. § 2164.04.

Claims 1-20 were rejected under Section 112, first paragraph, because it was alleged that the specification “...does not properly enable one of ordinary skill in the art to understand how one or more analog signals of predetermined voltage level are generated or how a dc output based on these analog signals is generated.” Appellants traverse.

As an initial matter, Appellants note that the objections in the Office Action are mostly directed to the lack of working examples for operation of charge redistribution in a digital-to-analog converter. However, Applicants assert that this is well known in the art, and provide a reference, “Principles of Data Conversion System Design,” by Behzad Razavi, IEEE press, November, 1995 (“Razavi”), showing that this is indeed the case, and that undue experimentation is not required.

35 U.S.C. 102 – Novelty

A claim is anticipated only if each and every limitation as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of Calif.*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is claimed. See *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Claims 1, 4, 5, 10 & 11 were rejected under Section 102(b) as allegedly being anticipated by Chow (U.S. Patent No. 6,002,599) Appellants traverse.

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The cited reference does not anticipate the claimed invention because it does not disclose all limitations of independent claims 1, 12 or 7.

Claim 1 includes, “a digital to analog (D/A) converter coupled to the oscillator for generating an analog signal of a predetermined voltage level based on the pumping signal as configured by a set of inputs thereof.” However, Chow does not disclose “a digital to analog (D/A) converter coupled to the oscillator for generating an analog signal of a predetermined voltage level based on the pumping signal as configured by a set of inputs thereof.”

Contrary to the Examiner’s assertion, element 31 in Fig. 5 of Chow, the “adaptive swing clock generator” does not function as the D/A converter in claim 1. Chow does not disclose inputs to element 31 that can be adjusted to configure the analog signal output. Teaching away from the invention, Chow discloses a “closed loop circuit with negative feedback... which ultimately settles into a steady-state condition.” Column 4, lines 37-39. Moreover claim 1 recites a “digital to analog converter.” Chow does not disclose any digital input to element 31; therefore element 31 cannot be considered a “DAC.” The output voltage in Chow is set by “the voltage division ratio of [a] voltage divider,” not digital inputs. Column 5, lines 30-32.

Within the context of the terminology of the present invention, CLK is seen as a digital input and o1/o2 are seen as analog outputs with amplitude modified by another input Vfb.” Claim 1 requires that, “said direct current output is configurable by adjusting the inputs of the D/A converter.” Vfb (in Chow) is not an input to a D/A converter, it is the output of a differential amplifier 34 that is feeding back the output of charge pumping circuit 32. Thus, Chow does not anticipate claim 1 on this basis alone.

Withdrawal of the Section 102 rejection is requested because all limitations of the claimed invention are not disclosed by the cited reference.

35 U.S.C. 103 – Nonobviousness

To establish a case of prima facie obviousness, all claim limitations must be taught or suggested by the prior art. See M.P.E.P. § 2143.03. Obviousness can only be established by combining or modifying the prior art teachings to produce the claimed invention if there is some teaching, suggestion, or motivation to do so found in either the references themselves or in the knowledge generally available to a person of ordinary skill in the art. See, e.g., *In re Fine*, 5

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USPQ2d 1596, 1598 (Fed. Cir. 1988); *In re Jones*, 21 USPQ2d 1941, 1943-44 (Fed. Cir. 1992). It is well established that the mere fact that references can be combined does not render the resultant combination obvious unless the desirability of that combination is also taught or suggested by the prior art. See *In re Mills*, 16 USPQ2d 1430, 1432 (Fed. Cir. 1990). Thus, even if all elements of the claimed invention were known, this is not sufficient by itself to establish a prima facie case of obviousness without some evidence that supplies the impetus to combine those teachings in the manner proposed by the Examiner. See *Ex parte Levengood*, 28 USPQ2d 1300, 1302 (B.P.A.I. 1993).

Evidence of the teaching, suggestion or motivation to combine or to modify references may come explicitly from statements in the prior art, the knowledge of a person of ordinary skill in the art or the nature of the problem to be solved, or may be implicit from the prior art as a whole rather than expressly stated in a reference. See *In re Dembiczak*, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999); *In re Kotzab*, 55 USPQ2d 1313, 1316-17 (Fed. Cir. 2000). Rigorous application of this requirement is the best defense against the subtle, but powerful, attraction of an obviousness analysis based on hindsight. See *Dembiczak* at 1617. Whether shown explicitly or implicitly, however, broad conclusory statements standing alone are not evidence because the showing must be clear and particular. See *id.*

Finally, a determination of *prima facie* obviousness requires a reasonable expectation of success. See *In re Rinehart*, 189 USPQ 143, 148 (C.C.P.A. 1976).

Dependent claims 2, 3, 6, 12-14, 16-18, 20 were rejected under Section 103(a) as allegedly being unpatentable over Chow (U.S. Patent 6,002,599) in view of Katsuhisa (U.S. Patent 6,762,640) or Komiya et al (U.S. Patent 6,714,065)

Note that the Examiner does not address claim 19 at all with respect to the prior art.

The failure of Chow to disclose the claimed invention is not remedied by the attempt to modify that disclosure with Katsuhisa or Komiya et al.

Claim 2 recites “the generator of Claim 1 further comprising a load capacitor coupled to the charge pump.” Because Katsuhisa fails to cure the deficiencies of Chow with respect to the features of claim 1 and 2, i.e. that Chow does not disclose nor suggest a D/A converter, and it would not have been obvious to include a D/A converter in Chow because Chow does not disclose or suggest digital inputs the applicant has overcome the examiner’s rejection of claim 2.

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With respect to rejected claims 3, 6, 12, 14, 16, 17 and 20, the combination of Chow in view of Komiya et al does not address the missing D/A converter. Each of these claims either recites or depends from a claim that recites “a digital to analog (D/A) converter coupled to the oscillator for generating an analog signal.” Komiya fails to cure the deficiency of Chow described above in that Chow does not disclose a digital to analog converter. Komiya does not disclose or suggest the addition of a D/A converter. Therefore none of claims 3, 6, 12, 14, 17 or 20 would have been obvious based on Chow and Komiya.

Finally with respect to claims 13 and 18 being unpatentable over Chow in view of Komiya et al. and Katsuhisa, Chow does not disclose a D/A converter, and Komiya and Katsuhisa fail to cure this deficiency. Therefore, neither claim 13 nor 18 would have been obvious based on Chow in view of Komiya et al. and Katsuhisa.

The combination of Chow (U.S. Patent 6,002,599) in view of Katsuhisa (U.S. Patent 6,762,640) or Komiya et al (U.S. Patent 6,714,065) do not render obvious the claimed invention because all limitations of independent claims 1, 12, and 17 are not found in the cited references. Moreover, claims depending from those independent claims are also not made obvious by the references because the limitations of claims 1, 12, and 17 are incorporated in the dependent claims. M.P.E.P. § 2143.03 citing *In re Fine*, 5 USPQ2d 1596 (Fed. Cir. 1988).

For the reasons stated above, the applicant asserts that the examiner's rejection of claims 2, 3, 6, 12-18 and 20 under 35 U.S.C. §103(a) has been overcome and requests that the rejection be withdrawn and the claims allowed. Withdrawal of the Section 103 rejection is requested because the invention as claimed would not have been obvious to a person of ordinary skill in the art at the time it was made.

Conclusion

For the reasons discussed above, Appellants respectfully request that the prior art and double-patenting rejections should be reversed by the Board. Appellants submit that the pending claims are in condition for allowance and earnestly request an early Notice to that effect.

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Respectfully submitted,

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VIII. CLAIMS APPENDIX

1. (once amended) A configurable voltage generator comprising:

an oscillator module for generating a pumping signal;

a digital to analog (D/A) converter coupled to the oscillator for generating an analog signal of a predetermined voltage level based on the pumping signal as configured by a set of inputs thereof; and

a charge pump coupled to the D/A converter for producing a direct current (DC) output based on the analog signals generated by the D/A converter,

wherein said direct current output is configurable by adjusting the inputs of the D/A converter.

2. (original) The generator of claim 1 further comprising a load capacitor coupled to the charge pump for smoothing the output.

3. (original) The generator of claim 1 wherein the oscillator is a ring oscillator.

4. (original) The generator of claim 3 wherein the pumping signal is a square wave signal.

5. (original) The generator of claim 4 wherein a voltage swing of the square wave signal is within a predetermined operating voltage range.

6. (original) The generator of claim 1 wherein the charge pump is a negative charge pump for generating at least one configurable negative output to be used as a substrate-bias voltage for reducing leakage of a semiconductor device.

7. (original) The generator of claim 1 further comprising a recovery module for clearing the output before generating a new value.

8. (original) The generator of claim 1 wherein the D/A converter further includes an initial control module for initializing the D/A converter.

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9. (original) The generator of claim 8 wherein the D/A converter further includes a code converter for transforming the inputs to a set of thermometer signals.

10. (original) The generator of claim 1 wherein the D/A converter is selected with a predetermined number of inputs based on a predetermined number of steps needed for the analog signals generated.

11. (original) The generator of claim 1 wherein the charge pump is a voltage doubler producing the output as a sum of a voltage output swing of the D/A converter and a supply voltage.

12. (once amended) A configurable voltage generator for providing a substrate-bias voltages for reducing leakage current, the generator comprising:

an oscillator module for generating a square wave pumping signal;

a digital to analog (D/A) converter coupled to the oscillator for generating an analog signal of a predetermined voltage level based on the pumping signal as configured by a set of inputs thereof; and

a negative charge pump coupled to the D/A converter for producing a direct current (DC) output based on the analog signals generated by the D/A converter.

13. (original) The generator of claim 12 further comprising a load capacitor coupled to the negative charge pump for smoothing the output.

14. (original) The generator of claim 12 wherein a voltage swing of the square wave pumping signal is within a predetermined operating voltage range.

15. (original) The generator of claim 12 further comprising a recovery module for clearing the output before generating a new value.

16. (once amended) The generator of claim 12 wherein the D/A converter is selected with a predetermined number of inputs based on a predetermined number of steps needed for the analog signals generated.

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17. (once amended) A method for producing one or more voltages by a configurable voltage generator for providing one or more substrate-bias voltages for reducing leakage current, the method comprising:

activating an oscillator module for generating a square wave pumping signal;

selecting a set of inputs to a digital to analog (D/A) converter coupled to the oscillator for generating an analog signal of a predetermined voltage level based on the pumping signal; and

wherein a negative charge pump coupled to the D/A converter produces a direct current (DC) output based on the analog signals generated by the D/A converter as configured by the selected inputs.

18. (original) The method of claim 17 further comprising smoothing the output by a load capacitor coupled to the negative charge pump.

19. (original) The method of claim 17 further comprising clearing the output before generating a new value.

20. (original) The method of claim 17 further comprising determining a desired substrate-bias voltage based on an optimal effect on the leakage current.

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IX. EVIDENCE APPENDIX

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X. RELATED PROCEEDINGS APPENDIX

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X. RELATED PROCEEDINGS APPENDIX

N1280-00350
Replacement Sheet

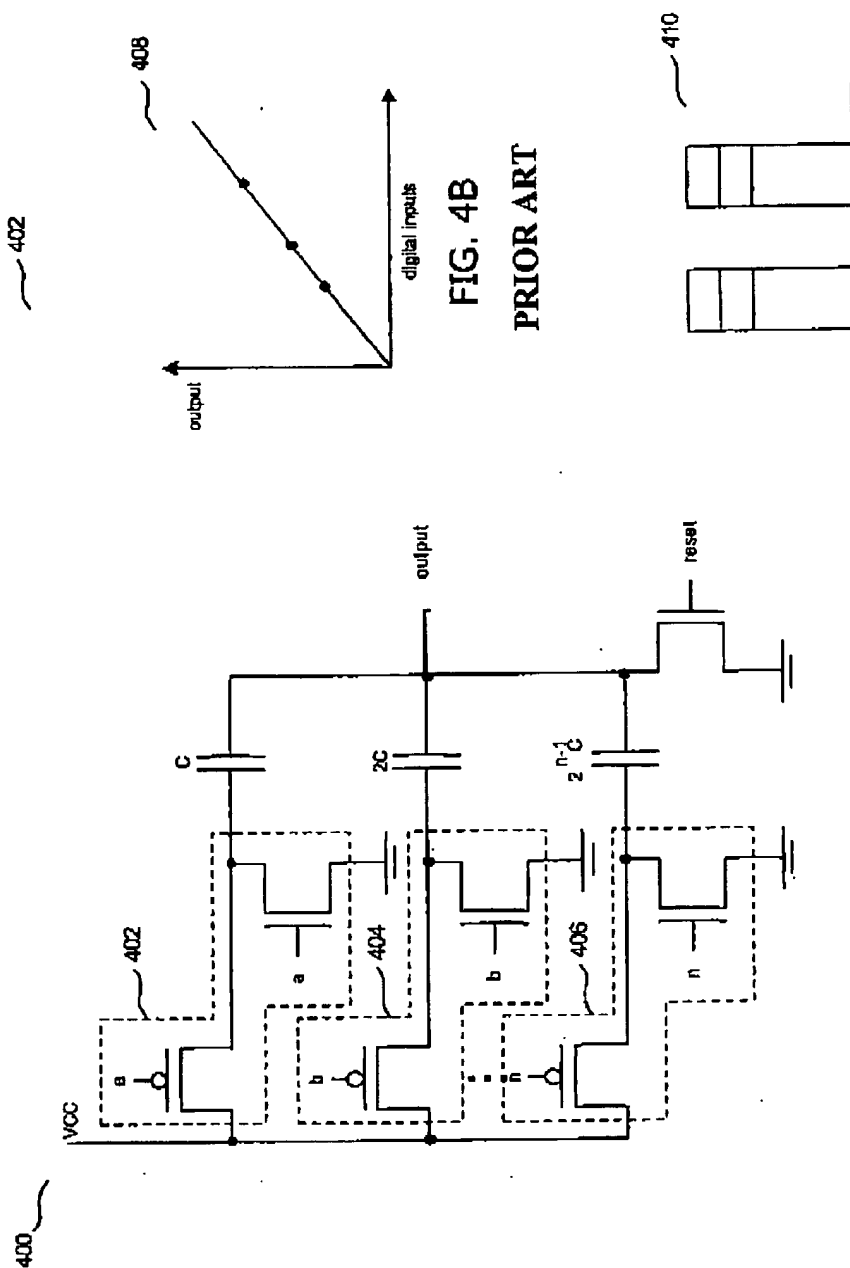


FIG. 4A
PRIOR ART

FIG. 4B
PRIOR ART

FIG. 4C
PRIOR ART

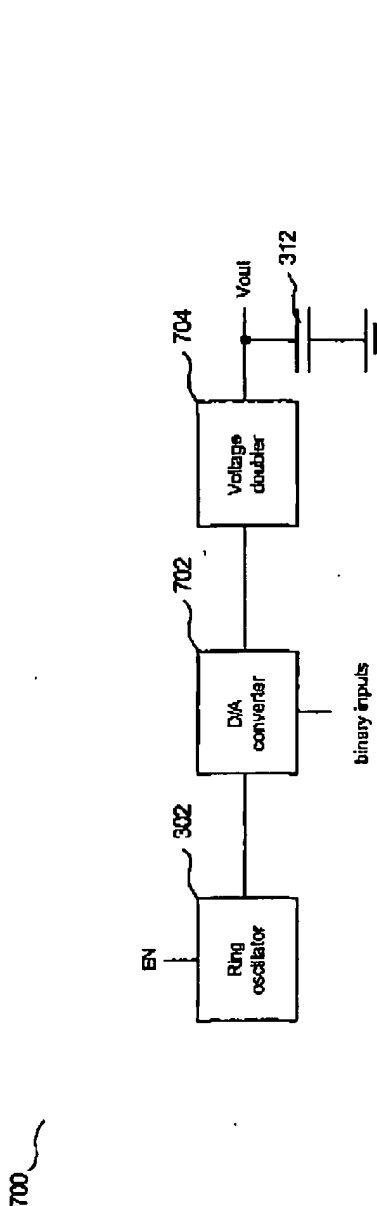


FIG. 7A

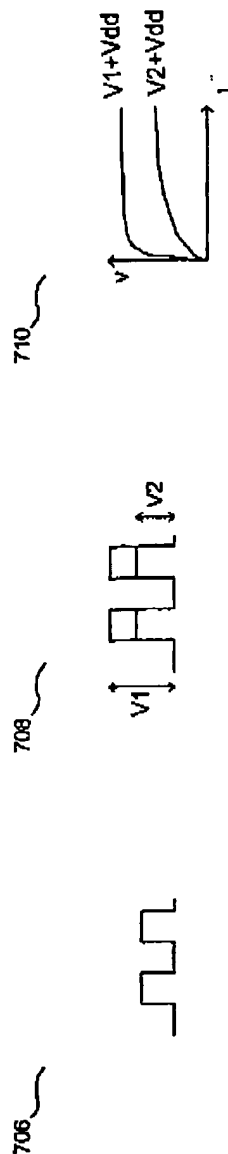


FIG. 7B

FIG. 7C

FIG. 7D

500

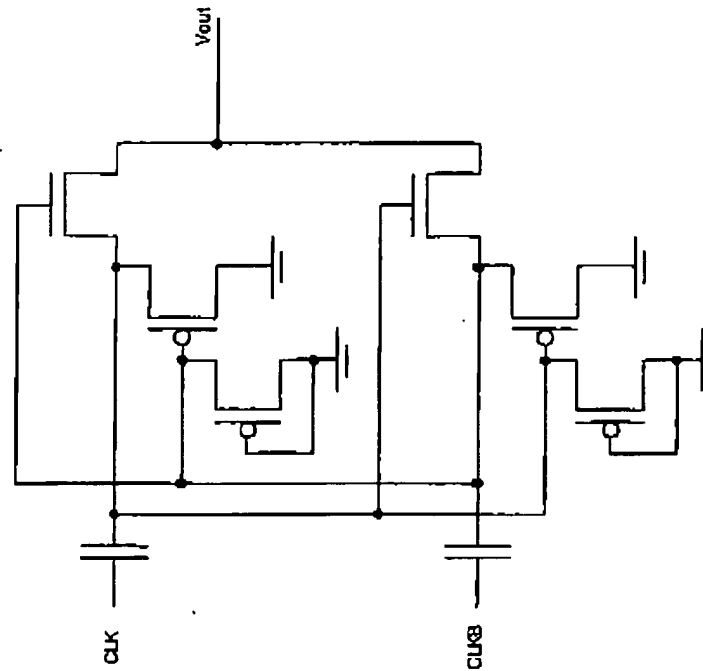


FIG. 5A
PRIOR ART

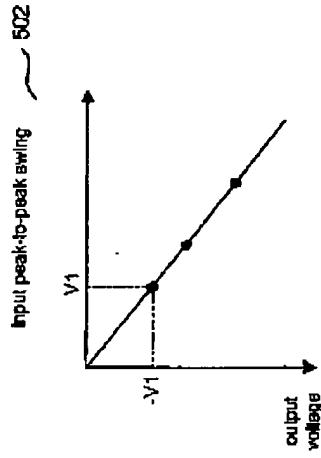


FIG. 5B
PRIOR ART

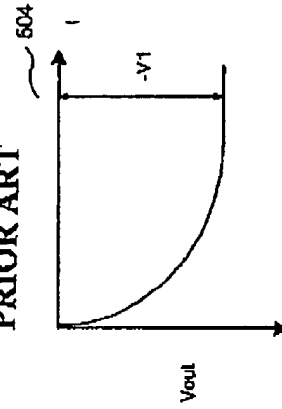


FIG. 5C
PRIOR ART